NASA Global Hawk
HS3 Payload Integration

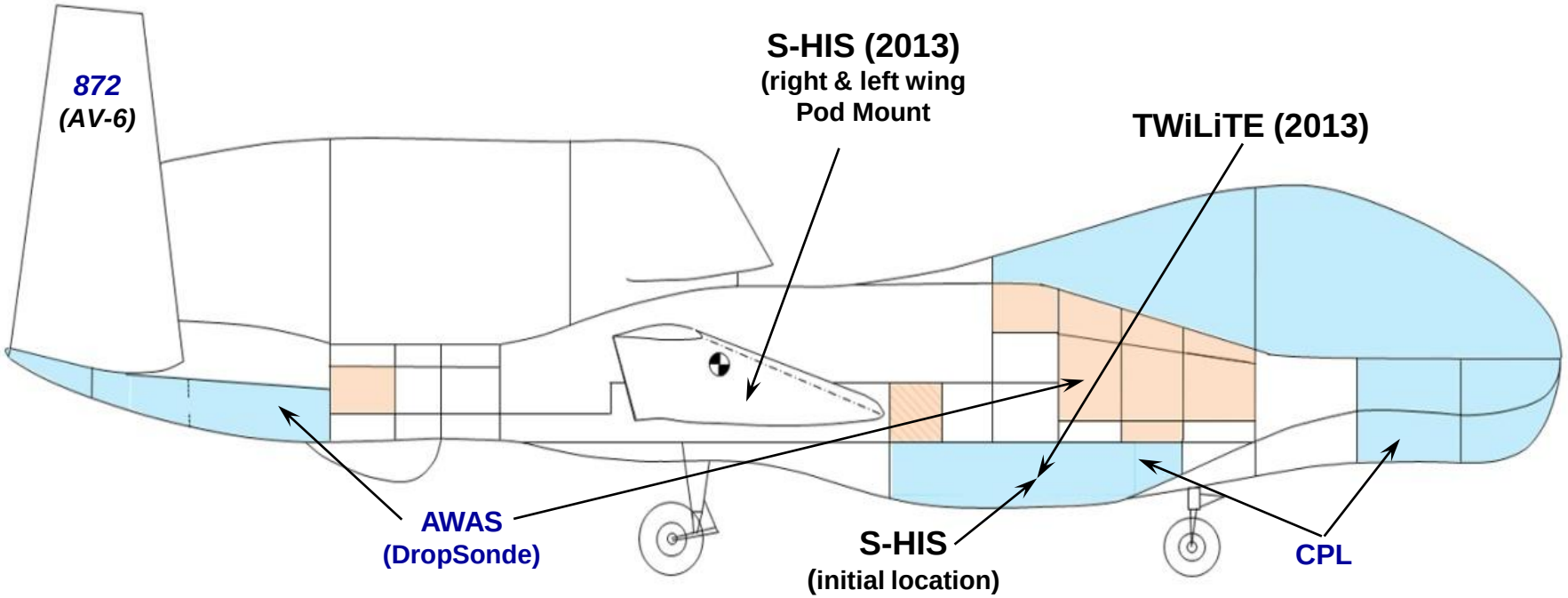
Dave Fratello, Payload Manager
October 20, 2010

Payload Integration Process

- **Initial Documentation Provided by P.I.**
  - **DFRC Payload Info & Hazard Questionnaire submission**
  - **Define instrument requirements, look angle, environment, etc.**
  - **Initial overview of power, data, communications, readiness**
- **DFRC visit to PI's lab**
  - **Discuss all aspects of integration, testing, and expected Ops**
- **DFRC Performs Integration Engineering, Fab, Reviews**
  - **PI provides solid model of instrument, incl. enviro. certs if needed**
  - **DFRC will coordinate engineering – use of NGC/DFRC Support**
  - **Regular telecoms with PI team and engineering**
  - **DFRC conducts internal Safety, airworthiness, analysis Reviews**
- **Initial Integration at DFRC, SIL Bench & Comm's Testing**
  - **3-5 days at DFRC**
- **Final Integration, CST, Tech Review's, Range Flight**

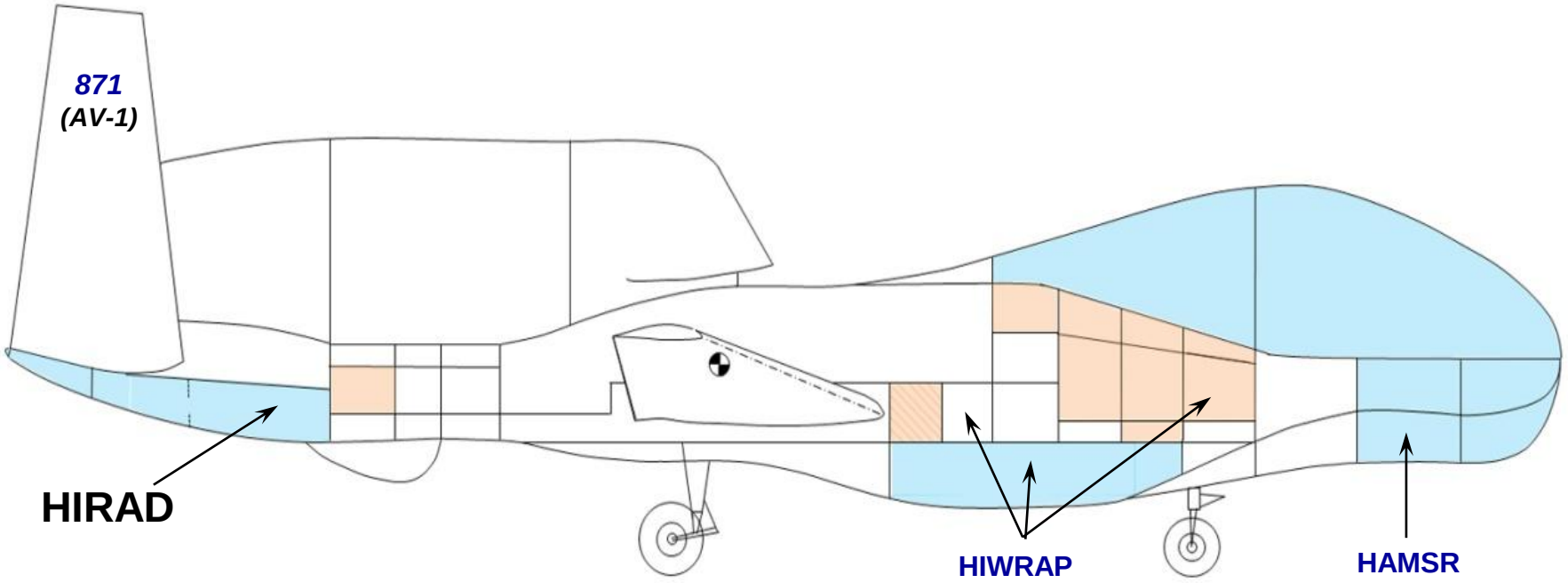
HS3 Payload Integration

AV-6 *"Environmental" Instrument Configuration*

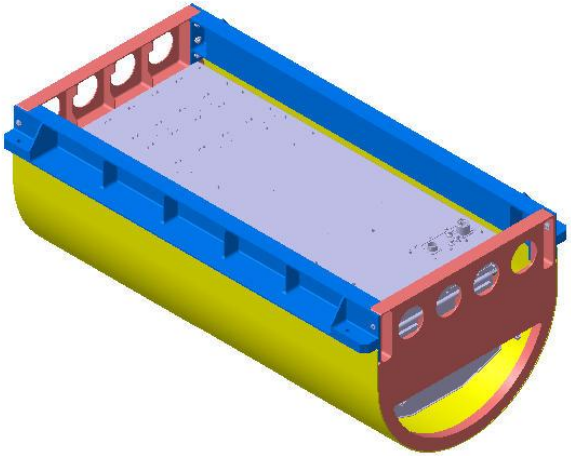


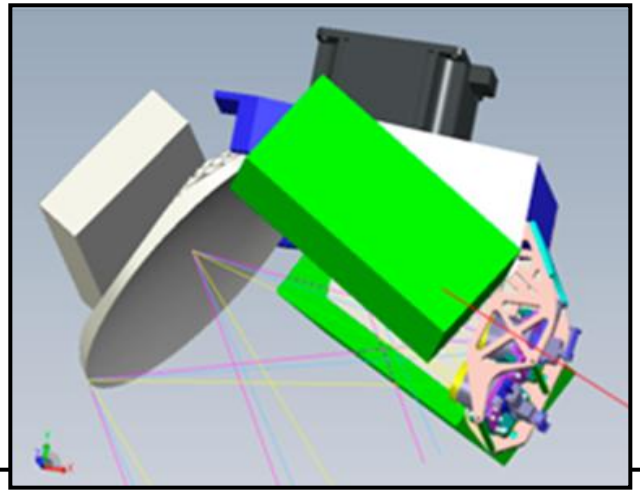
HS3 Payload Integration

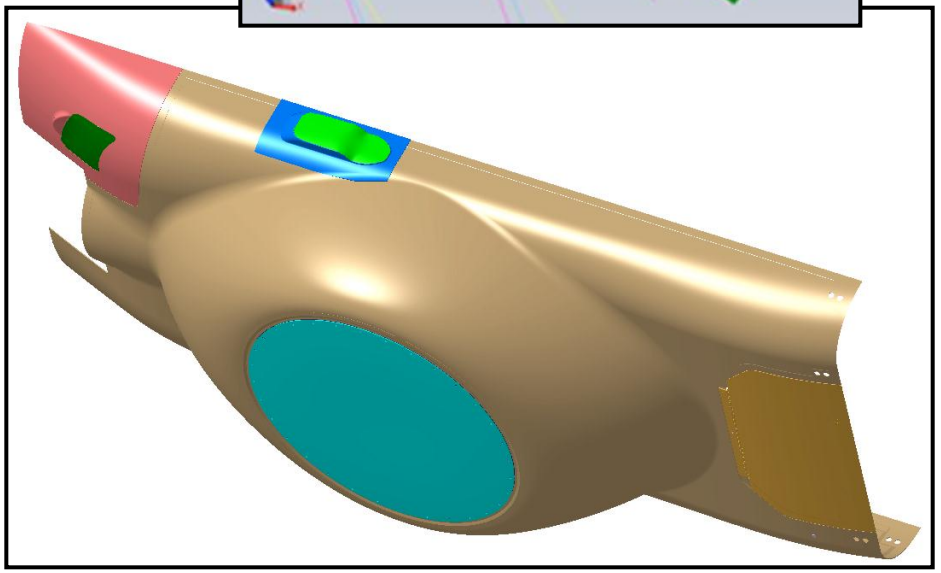
AV-1 *"Over Storm" Instrument Configuration*



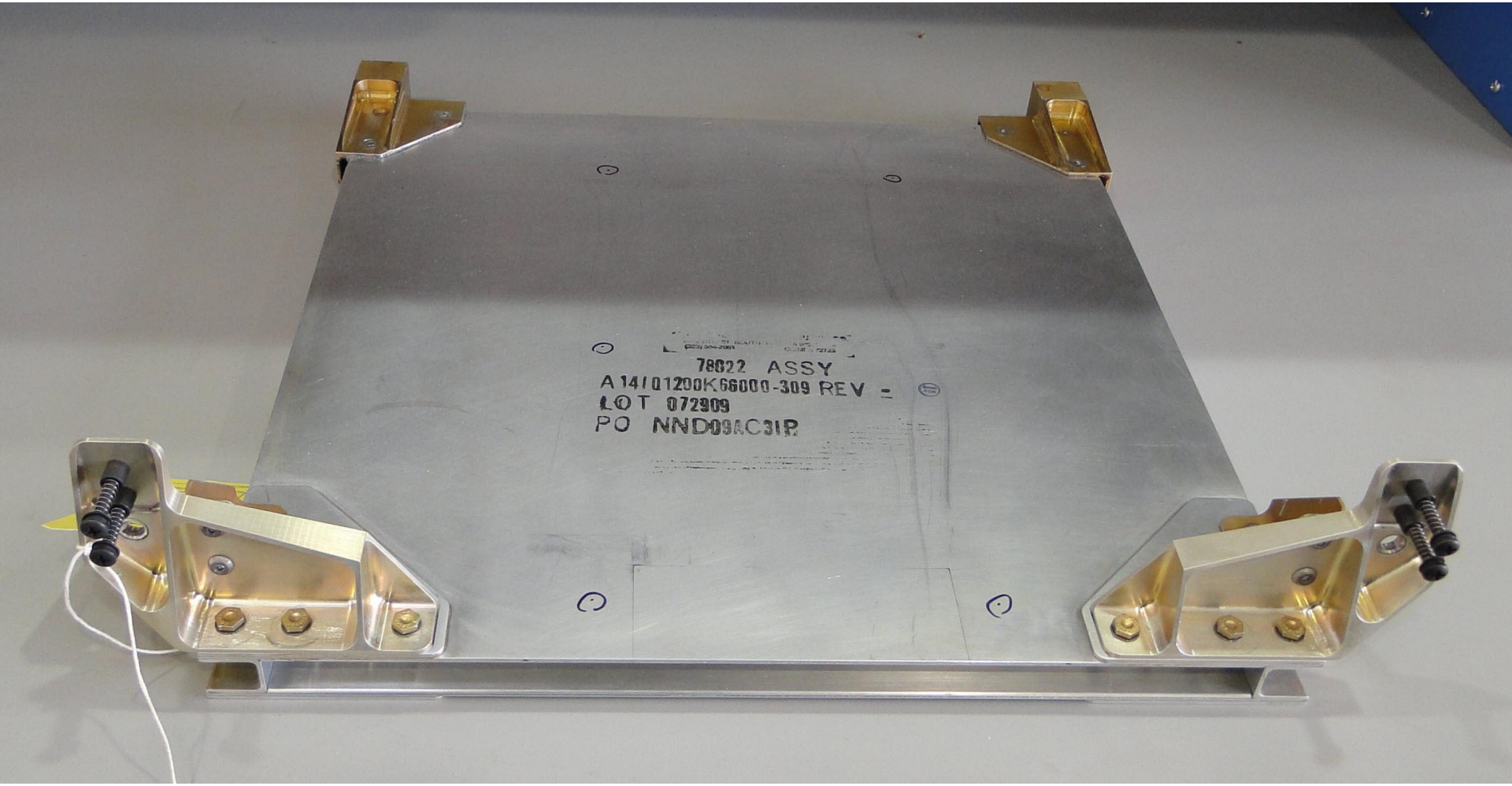
Integration Engineering



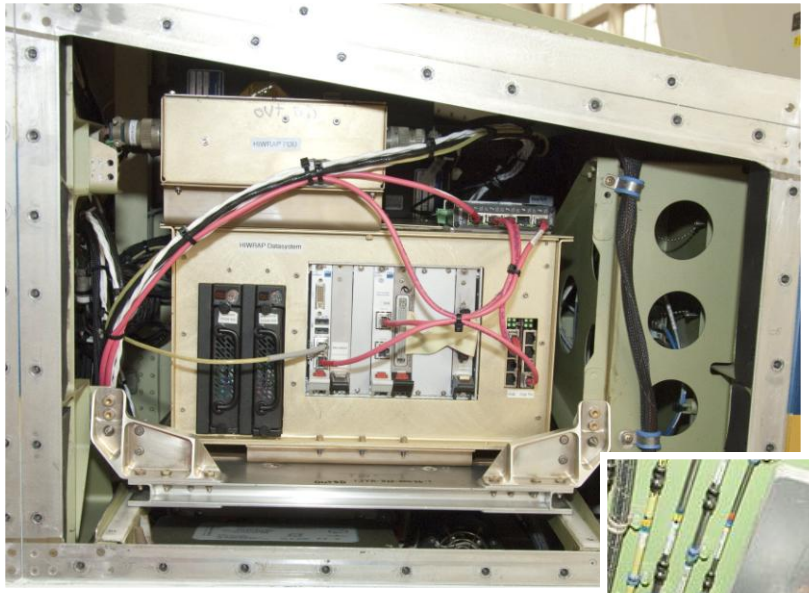




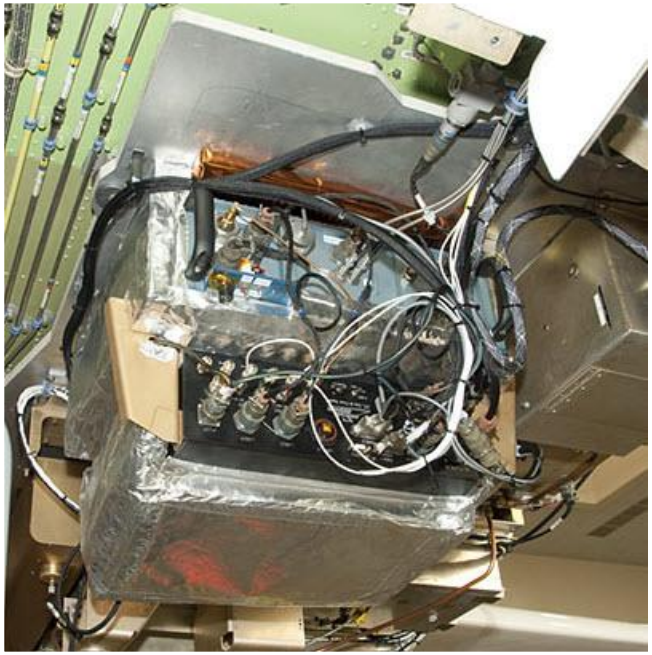
Payload-mount Slide-in Pallets



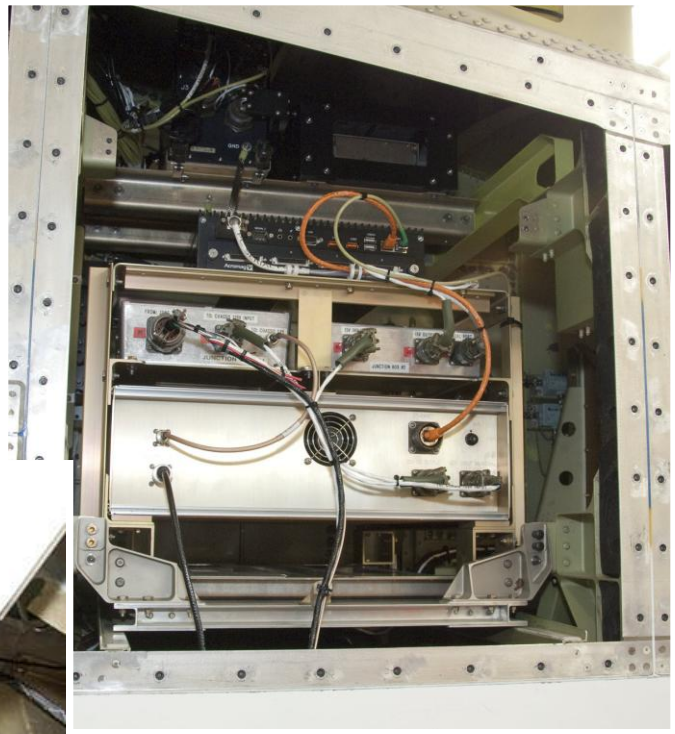
HS3 Integration Examples



AVAPS Data Unit
(Zone-16)



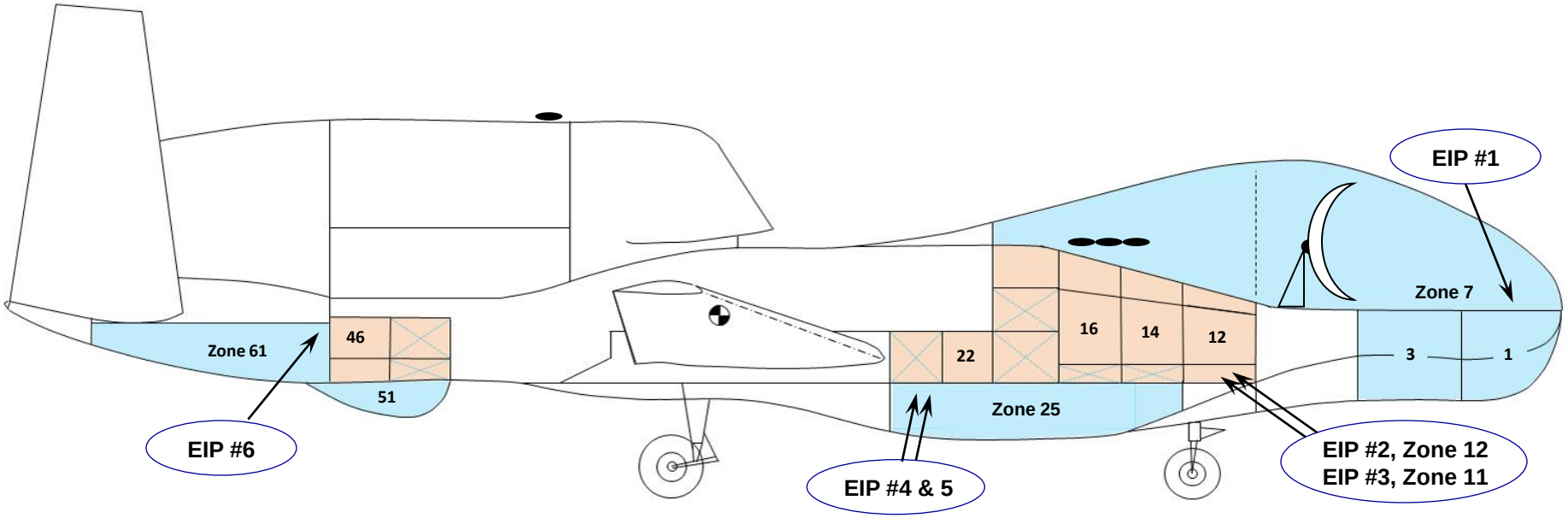
CPL Data Equipment (Zone-25)



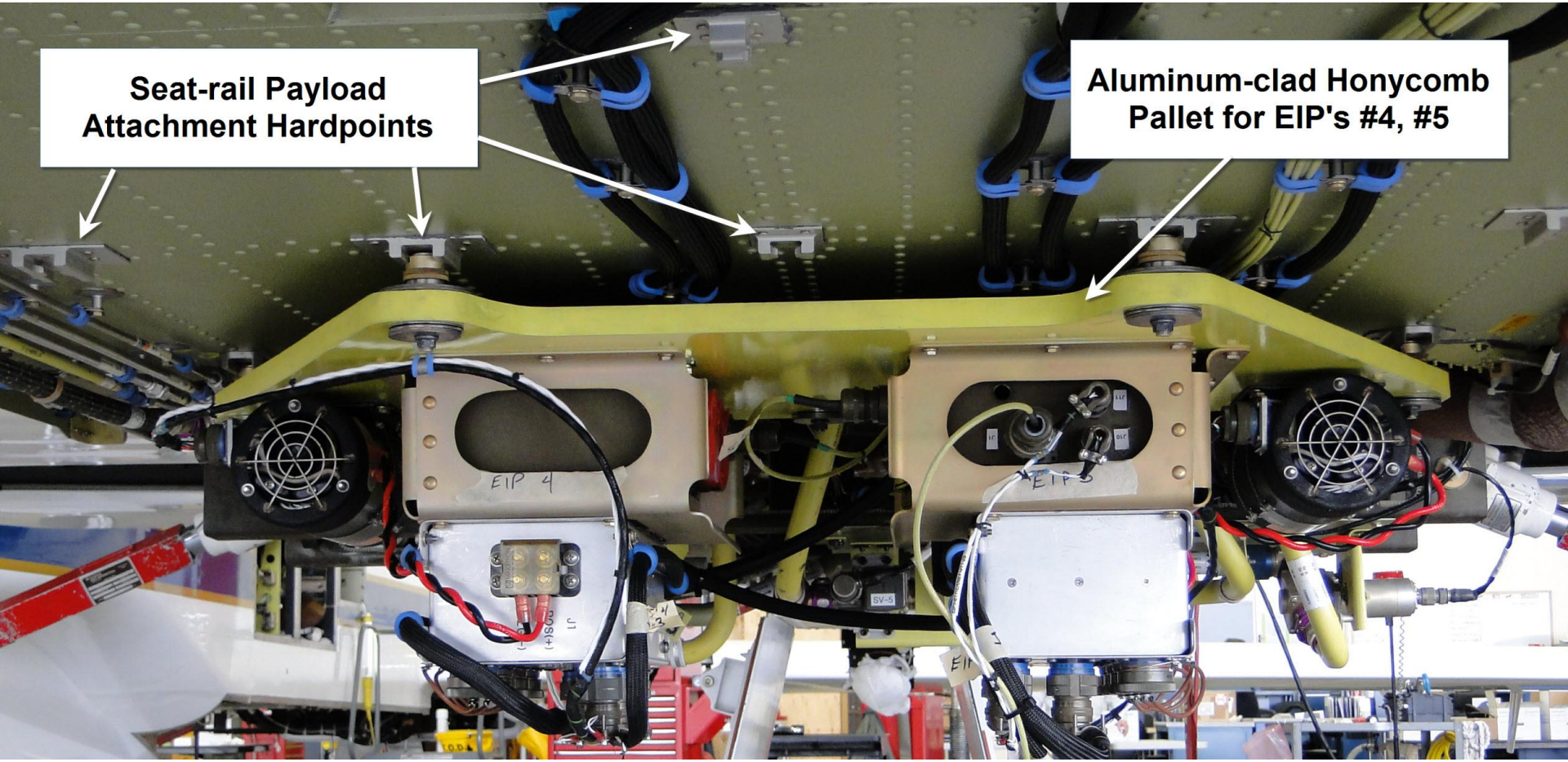
HIWRAP Data Unit
(Data 12)

Airborne Payload C3 System

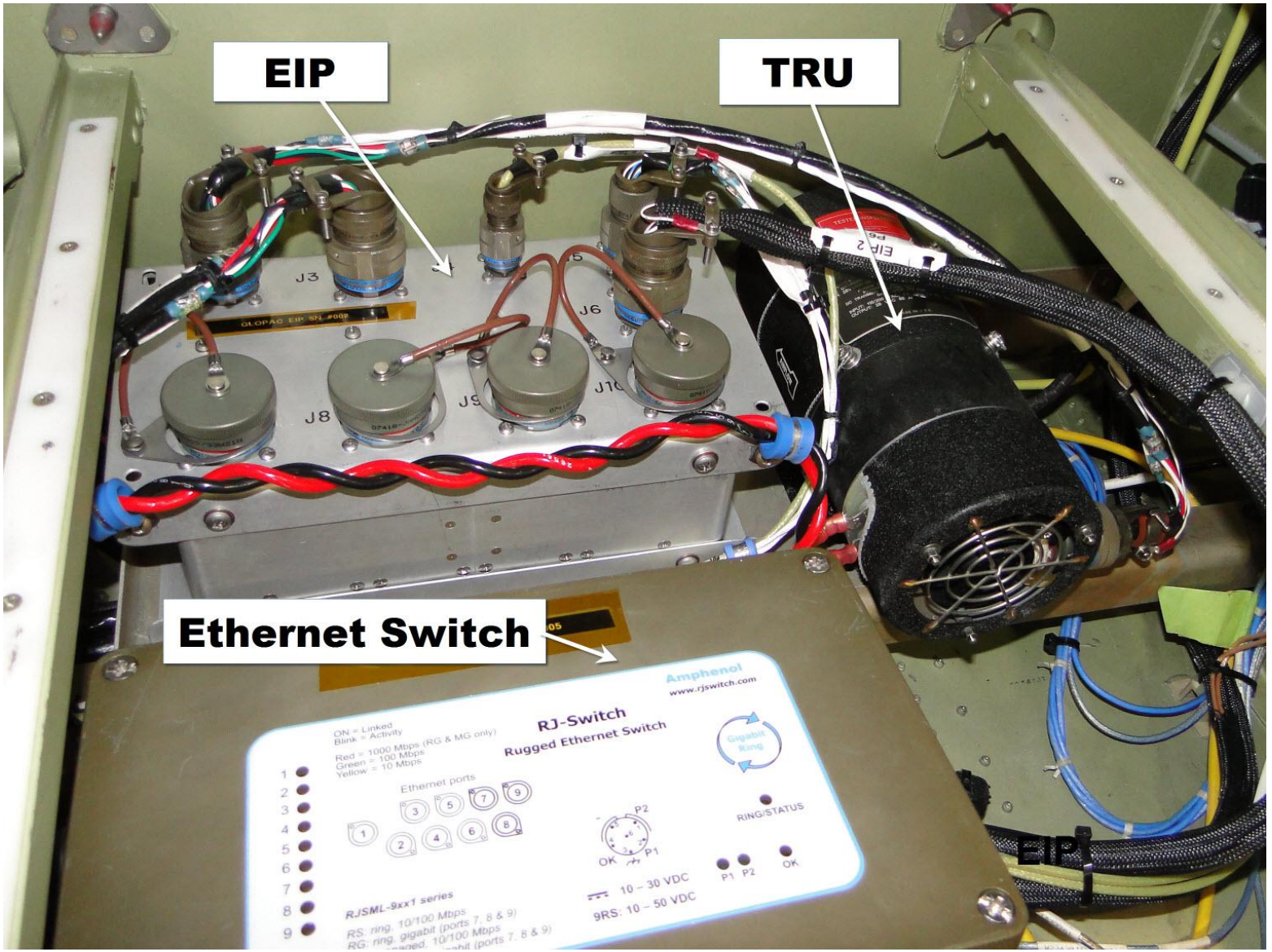
Experiment Interface Panel (EIP) Module Locations



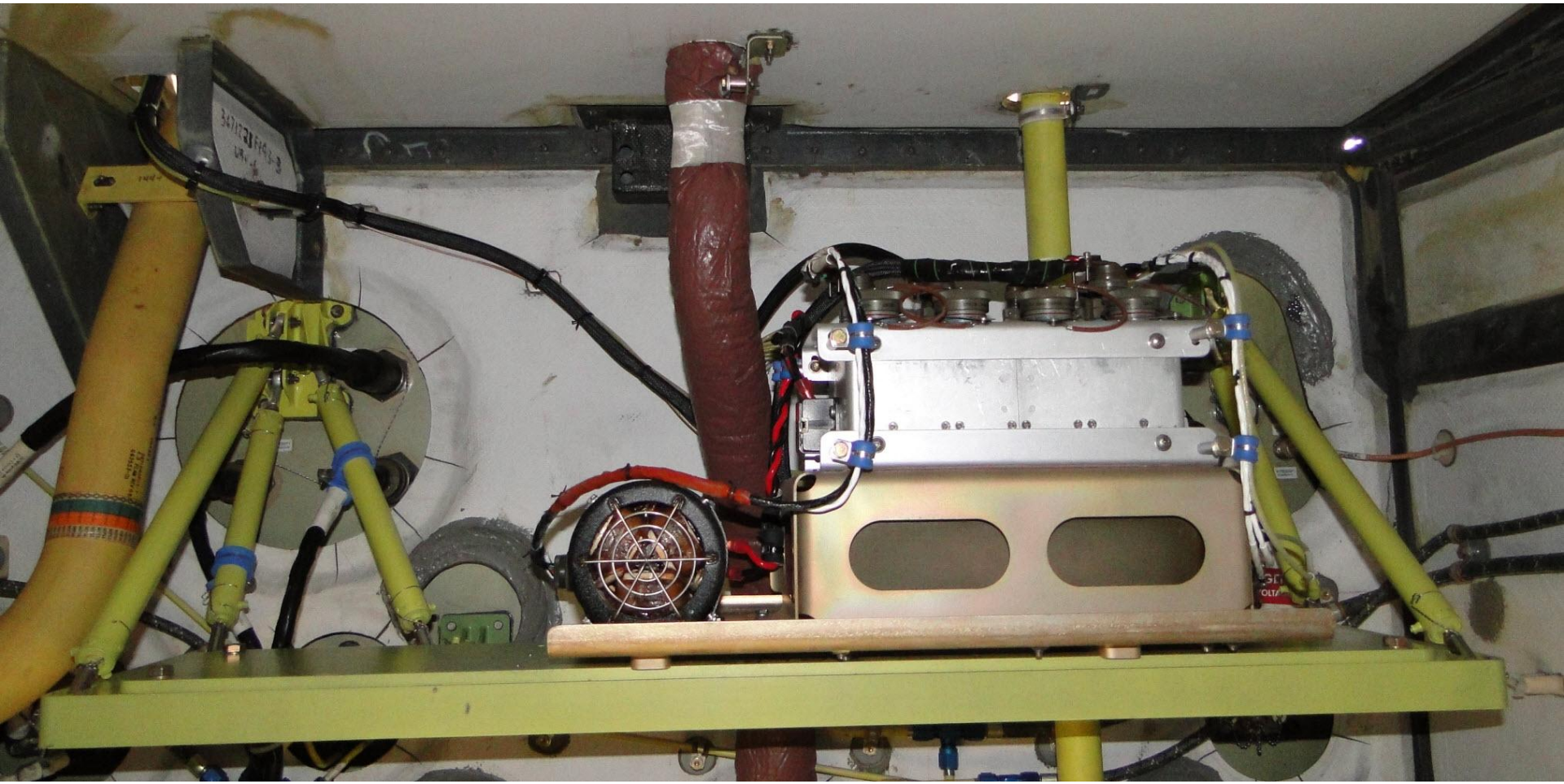
EIP Modules – Zone-25 Details



EIP Module – Zone-12 Details

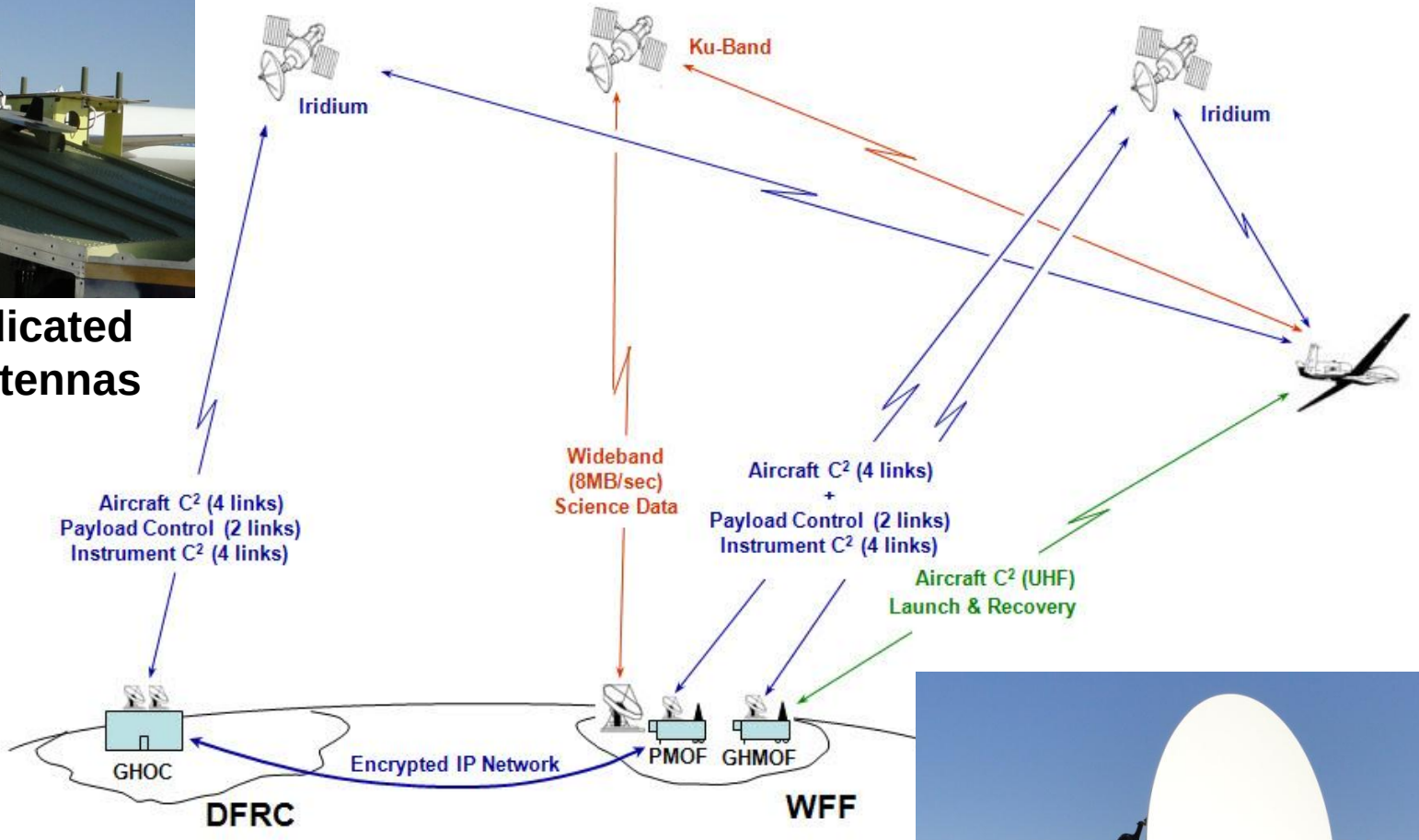


Zone-61 Mount, EIP Module



Payload Satcom Links

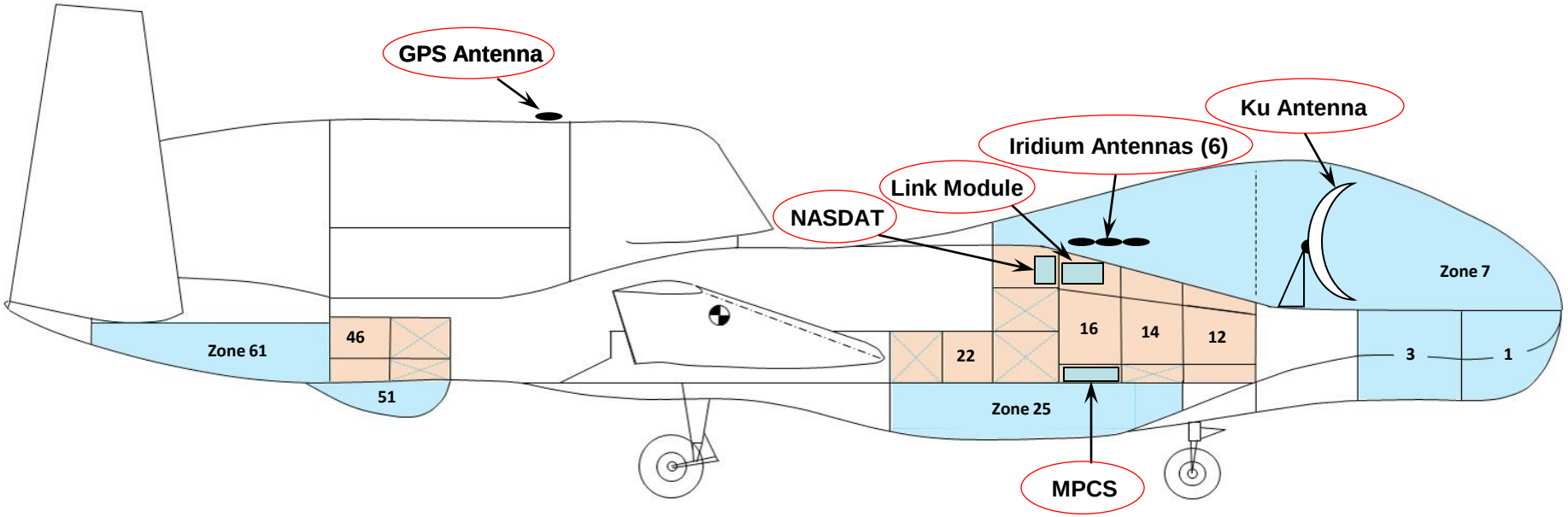
APCS-dedicated Iridium Antennas



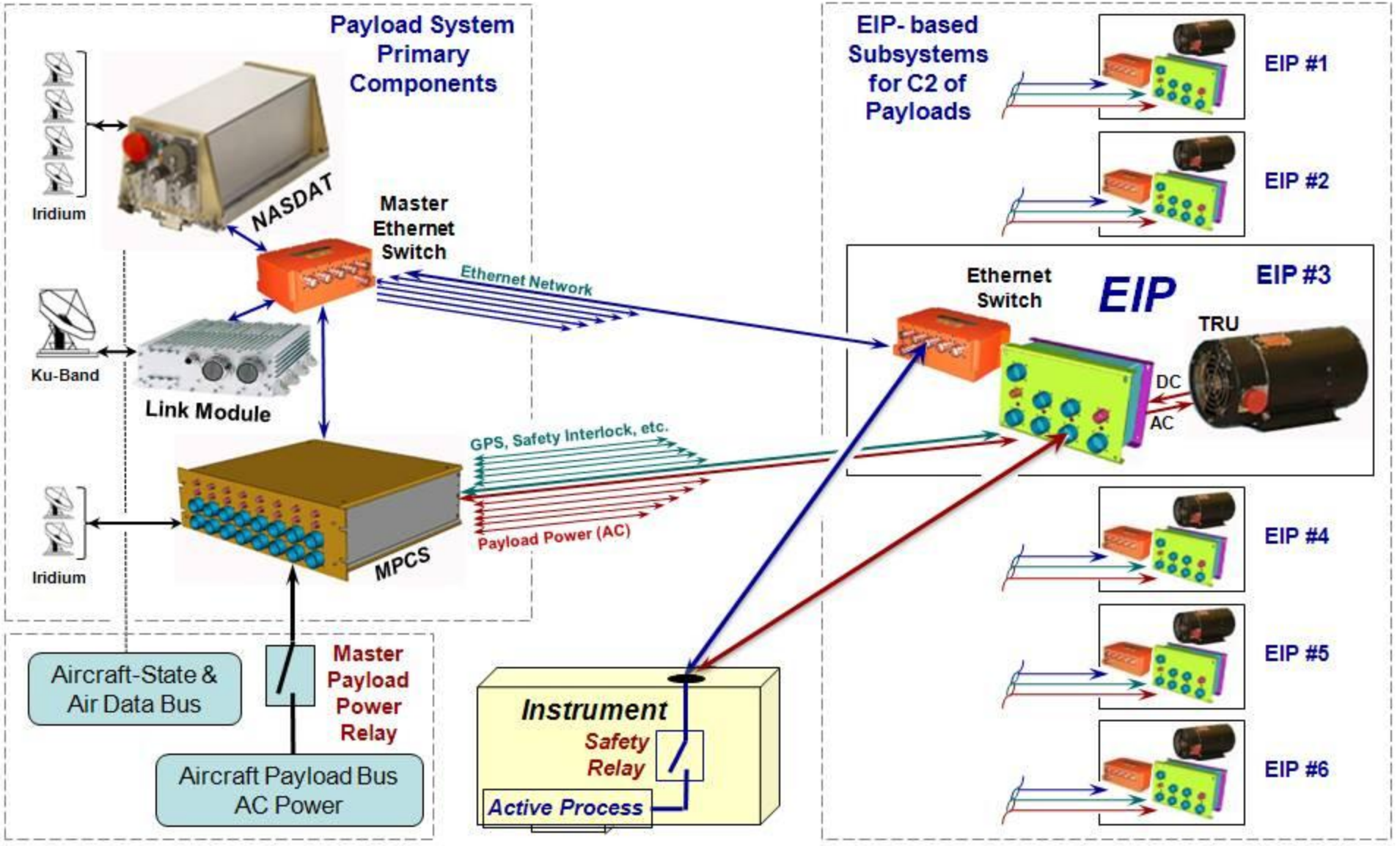
48” Ku Payload Wideband Antenna

Airborne Payload C3 System

APCS Electronics and Antenna Components



GH Airborne Payload C3 System



Integration-related Issues

- **DFRC Avionics will provide all harness wiring**
  - EIP Power Harness (PI provides instrument interface plug)
  - Ethernet Harness (PI provides instrument interface plug – if not RJ-45)
  - All instrument interbox Harnesses that don't meet DFRC Aircraft Specs
- **Environmental Testing of Instrument**
  - Legacy instruments are waived if flown at similar altitudes and pressures
  - New instruments will require temp, pressure, vibration testing
    - DFRC Environmental Lab can be used – but possible sched. impact
- **Communications Protocol**
  - Health & Status Packets are required during Instrument operation
  - Plan on using the Ku-Satcom bandwidth
    - Wide-band data communication to your ground computer
    - Real-time link to your software to enhance airborne operation
    - Work with DFRC Payload Comm's Engineer for protocol


NASA
NORTHROP GRUMMAN
872
DRYDEN FLIGHT RESEARCH CENTER